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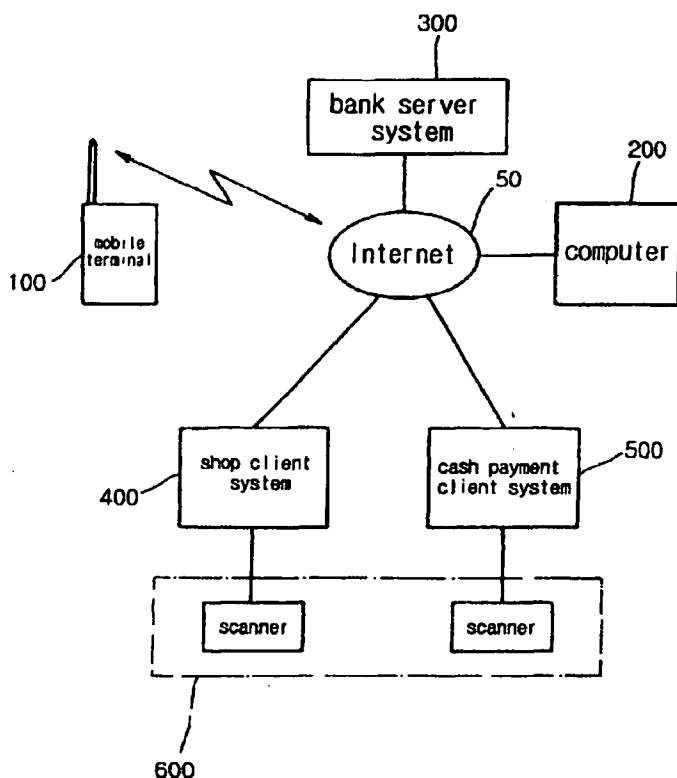
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(54) Title: **THE ELECTRONIC SETTLEMENT SYSTEM, ELECTRONIC SETTLEMENT METHOD AND CASH PAYING METHOD USING LCD BARCODE DISPLAYED ON MOBILE TERMINAL**



(57) Abstract: Disclosed are an electronic settlement system, an electronic settlement method, and a cash payment method using a LCD barcode displayed on a mobile terminal, thereby simply performing member identification using the LCD barcode including member information, electronic settlement services (such as credit card settlement, direct payment card settlement, advance payment card settlement, small amount settlement, and Giro system settlement) at various shops via a procedure verifying whether a user is an actual owner of the barcode, cash payment services via member information barcode and member identification procedures, advance payment card services by depositing a designated amount of money at a database of the bank and allowing the user to systematically use the advance card within the deposited money, and wireless banking services for transmitting and receiving various banking related data via wireless network between the bank and the members.



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THE ELECTRONIC SETTLEMENT SYSTEM, ELECTRONIC  
SETTLEMENT METHOD AND CASH PAYING METHOD USING LCD  
BARCODE DISPLAYED ON MOBILE TERMINAL

Technical Field

5           The present invention relates to an electronic settlement system using a  
LCD barcode displayed on a mobile terminal such as a mobile telephone terminal,  
a PDA (Personal Digital Assistant), or a pager, and more particularly to an  
electronic settlement system, an electronic settlement method, and a cash payment  
method using a LCD barcode displayed on a mobile terminal, thereby simply  
10       performing member identification using the LCD barcode including member  
information, electronic settlement services (such as credit card settlement, direct  
payment card settlement, advance payment card settlement, small amount  
settlement, and Giro system settlement) at various shops via a procedure verifying  
whether a user is an actual owner of the barcode, cash payment services via  
15       member information barcodes and member identification procedures, small  
amount settlement services for settling traffic expenses and for use of a vending  
machine without coins, advance payment card services by depositing a designated  
amount of money at a database of a bank and allowing a member to systematically  
use the advance card within the deposited money, and wireless banking services  
20       for transmitting and receiving various banking related data via wireless network  
between the bank and the members.

Background Art

25       Conventionally, an electronic settlement service system employs a credit  
card in a form of a magnetic card, and an electronic small amount settlement  
service system employs a smart card formed by installing a IC chip in a mobile  
telephone. In the credit card settlement system, information about a member is  
stored by a credit settlement terminal installed at a shop or a cash dispenser, and  
then read by a card reader of the credit settlement terminal or the cash dispenser.  
The credit settlement terminal or the cash dispenser transmits the read information

to a bank system via a PSTN (public switched telephone network), thereby providing credit card services to the member. On the other hand, in the smart card settlement system in which the IC chip is installed within the mobile telephone, data corresponding to a designated amount of money is stored in the IC chip. Therefore, whenever the member settles the small amount of money using the smart card, the amount of money is deducted from the stored total amount. Therefore, if stored total amount of the money is completely spent, the IC must be recharged.

The aforementioned conventional systems have several problems as follows. First, it is not easy to possess a plurality of the magnetic cards. As the number of banks for which a member registers increases, the number of cards issued by different banks and then possessed by the member also increases, thereby causing an inconvenience and increasing the possibility of loss. Particularly, the number of cards possessed by one member, including department cards and customer management cards at each shop as well as the bank credit cards, drastically increases, thereby being difficult in management.

Second, in case of the smart card, the IC chip for storing electronic currency is installed within the mobile terminal, thereby increasing the production cost of the mobile terminal. Further, after the stored money is completely spent, the IC chip must be recharged, thereby making the member to go to a charging station and generating an inconvenience to the member. Further, a cash payment service cannot be provided to the member via the smart card system.

Third, since the conventional credit card service system cannot receive various messages from banks or department stores, it cannot various banking services. For example, when a member wants to receive banking services such as a money transfer from an account to another account, the member needs to visit the corresponding bank or use other media such as telephone and Internet. Further, in case of introducing new products of the banks or the department stores, the magnetic card cannot transmit and receive various service related messages.

Fourth, since the credit card service using the magnetic card and the smart card service using the IC chip are two separate services, it is difficult to integrate two services one thing, thereby causing complicate matters to the members. For example, in order to use the small amount settlement service, the member must

possess the smart card installed on the mobile terminal. On the other hand, in order to use the cash payment service, the credit card service, etc., the member must possess the bank card in a form of the magnetic card separately from the mobile terminal. Therefore, it is impossible to provide an integrated banking service to the members.

### Disclosure of the Invention

Therefore, the present invention has been made in view of the above problems, and it is an object of the present invention to provide an electronic settlement system, an electronic settlement method, and a cash payment method using a LCD barcode displayed on a LCD window of a mobile terminal such as a cellular phone, a PDA (Personal Digital Assistant), or a pager, thereby removing the conventional inconvenience in possession and danger in loss of credit cards and the conventional inconvenience in recharge in smart cards, promoting wireless banking services via wireless network, and integrating the credit card service as settlement means and the smart card service as electronic currency means.

In accordance with the present invention, the above and other objects can be accomplished by the provision of an electronic settlement method using a LCD barcode displayed on a mobile terminal via Internet, comprising the steps of: (a) allowing a user to be connected to a bank server system using a computer or a mobile terminal and to register to the system to become a member, and conferring a specific barcode on the registered member; (b) transmitting the conferred barcode to the mobile terminal of the corresponding member; (c) inputting the barcode stored by the member's mobile terminal, a member's password, and total amount to be settled; (d) transmitting the inputted barcode data, the member's password, and the total amount to be settled to the bank server system, and requesting the bank server system to settle the total amount; (e) verifying the member's settlement possibility upon receiving a request for the electronic settlement from a shop client system, and then in case the settlement is possible, performing the settlement and transmitting settlement completion data to the requested shop client system or in case the settlement is impossible, transmitting settlement impossibility data to the requested shop client system; and (f)

processing the settlement transaction in case the settlement completion data are transmitted to the requested shop client system, or displaying the reason of the settlement impossibility via a screen in case the settlement impossibility data are transmitted to the requested shop client system.

## 5                    Brief Description of the Drawings

The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

10                    Fig. 1 is a schematic view of an electronic settlement system using a LCD barcode displayed on a mobile terminal in accordance with the present invention;

Fig. 2 is a flow chart of the electronic settlement system of Fig. 1;

Fig. 3 is a schematic view of a bank server system in accordance with the present invention;

15                    Fig. 4 is a schematic view of a shop client system in accordance with the present invention;

Fig. 5 is a schematic view of a cash payment client system in accordance with the present invention;

Fig. 6 is a schematic view showing one example of a barcode applied in the present invention;

20                    Fig. 7 is a flow chart of an electronic settlement method using a LCD barcode displayed on a mobile terminal in accordance with the present invention; and

Fig. 8 is a flow chart of a cash payment method using a LCD barcode displayed on a mobile terminal in accordance with the present invention.

## 25                    Best Mode for Carrying Out the Invention

Now, an electronic settlement system using a LCD barcode displayed on a mobile terminal in accordance with the present invention will be described in detail with reference to the accompanying drawings. In the drawings, elements having the same or similar configurations and functions are denoted by the same

reference numerals even though they are depicted in different drawings.

In the electronic settlement system of the present invention, a mobile terminal 100, a computer 200, a bank server system 300, a shop client system 400, and a cash payment client system 500 are connected together via cable and wireless Internet.

Fig. 1 is a schematic view of the electronic settlement system using the LCD barcode displayed on the mobile terminal in accordance with the present invention. With reference to Fig. 1, the electronic settlement system of the present invention comprises the mobile terminal 100, the computer 200, the bank server system 300, a barcode scanner 600, and the shop client system 400, and the cash payment client system 500. Users register for the electronic settlement system to become members of the system of the present invention using the mobile terminal 100 via wireless Internet. Further, the mobile terminal 100 serves to receive and store the LCD barcode via wireless Internet. The users also register for the electronic settlement system to become members of the system of the present invention using the computer 200 via Internet. When the users register for the electronic settlement system of the present invention, the bank server system 300 creates individual barcodes for each member and transmits the created barcodes to the mobile terminal 100 of the corresponding member. Further, when the bank server system 300 receives a request for user's identification and a settlement request, the bank server system 300 responds to each request and transmits a result of the user's identification and a settlement authentication. The scanner 600 serves to read the LCD barcode displayed on the mobile terminal 100. The shop client system 400 receives inputted data including a total amount to be settled and a member's password as well as the LCD barcode scanned by the scanner 600, and requests the bank server system 300 to identify the user and to settle the amount. Then, the shop client system 400 is notified of the result of the user's identification and the settlement authentication by the bank server system 300, performs the settlement transaction, and outputs a settlement slip to the user. The cash payment client system 500 receives inputted data including a total amount to be paid and a member's password as well as the LCD barcode scanned by the scanner 600, and requests the bank server system 300 to identify the user and to verify the possibility of cash payment. Then, the cash payment client

system 500 is notified of the result of the user's identification and the result of the verification of the cash payment possibility by the bank server system 300, performs the cash payment, and outputs a payment statement to the user.

5       The mobile terminal 100 serves to store and display the LCD barcode data of the members received via wireless Internet and to transmit/receive various messages for wireless banking service in connection with the bank server system 300. Herein, the front part the LCD barcode data represents a designated bank. Therefore, a plurality of the barcodes representing different banks may be stored by the mobile terminal 100 and then the user may select one from these barcodes  
10       according to desired banks.

      The computer 200 is used as a terminal unit for inputting member information data and transmitting related response messages upon member registration and log-on. Further, the computer 200 serves to receive all information and various messages in connection with the banking service  
15       transmitted from the bank server system 300.

      Fig. 2 is a flow chart of the electronic settlement system of Fig. 1. With reference to Fig. 2, the arrows P1 and P1' show the member application, the arrow P2 shows the barcode transmission, the arrows P3 and P3' show the barcode scan, the arrows P4 and P4' show the input of the scanned barcode, the arrows P5 and  
20       P5' show the request for the user's identification, the arrows P6 and P6' show the result of the user's identification, the arrow P7 shows the request for the charge settlement, and the arrow P8 shows the result of the charge settlement. The arrow P7' shows the request for the cash payment and the arrow P8' shows the result of the cash payment.

25       Fig. 3 is a schematic view of the bank server system 300 in accordance with the present invention. With reference to Fig. 3, the bank server system 300 has several functions, such as an account management function for credit card service, an account balance check function for small amount settlement service allowing the electronic settlement of traffic expenses and the use of a vending machine  
30       without coins, a deposit managing and balance check function for advance payment card service allowing the user to use an advance payment card charged with a designated amount of money. Further, the bank server system 300 has a cable and wireless banking service function. Via the cable and wireless banking



service of the bank server system 300, the member receives services such as account checking and money transfer into other accounts, and various new product recommendations. In order to perform these functions, the bank server system 300 is connected to the computer 200, the shop client system 400, and the cash payment client system 500 via cable Internet, and to the member's mobile terminal 100 via wireless Internet.

The aforementioned bank server system 300 comprises a controller 310, a monitor 320, and a keyboard 330. The controller 310 controls the member management, the barcode creation, the account management, the database, and the security management functions. The monitor 320 outputs a screen by the control of the controller 310.

The controller 310 comprises a member management unit 311, a barcode creation unit 312, an account management unit 313, a database 314, a wireless banking service unit 315, and a cable and wireless Internet connection unit 317. The member management unit 311 manages registration and cancellation of membership. The barcode creation unit 312 creates a member's specific barcode. The account management unit 313 manages the whole transaction history of the member's account. The database 314 stores and manages various data including member's information data, barcode data, account data, maintenance and management data relating to the system operation, and data for Internet banking services. The wireless banking service unit 315 performs wireless banking services, and the cable and wireless Internet connection unit 317 performs cable and wireless Internet connection functions.

The member management unit 311 informs the users of a contract, a service introduction, a member registration procedure, etc. Upon the member registration, the member management unit 311 stores names, resident registration numbers, mobile terminal numbers, telephone numbers, addresses, genders, occupations, etc., inputted by the members, in the database 314. Upon the member cancellation, the member management unit 311 clears the database 314, including the above data of the member. Further, the member management unit 311 stores a history showing all services provided from the bank server system 300 to the member, and creates a congratulatory message and transmits it to the cable and wireless Internet connection unit 317 on a member's special occasion such as

a birthday or a wedding anniversary. When the admission of the member is completed, the member management unit 311 requests the barcode creation unit 312 to create the member's specific barcode.

5       The barcode creation unit 312 receives the request for the member's specific barcode from the member management unit 311 and creates barcode data including a bank code and a check code. The created barcode is transmitted to the cable and wireless Internet connection unit 317.

10       The barcode, for example, consists of eighteen spaces. Herein, middle fourteen spaces create a member code corresponding to a member number, and then whether this member number is already used by the existing member is checked. The first two spaces create a bank code, and the last two spaces create a check code.

15       The account management unit 313 has a function of managing the transactions of the account of the member. When the member performs a money deposit or a money transfer from an account to another account, the account management unit 313 updates the balance of the member's account and stores the corresponding data in the database 314.

20       Further, upon receiving a request for the electronic settlement service from a shop, the account management unit 313 performs a function of verifying the member's settlement possibility. In case of the advance payment service, the account management unit 313 verifies whether the payment amount of the member is more than a limit, i.e., a predetermined limit of his/her advance payment card. If the payment of the member is more than the limit, the account management unit 313 notifies the member of a settlement impossible message via the network.

25       Upon receiving a request for the balance check from the member management unit 311 or the wireless banking service unit 315, the account management unit 313 checks the database regarding to the account of the corresponding member and then notifies the member management unit 311 or the wireless banking service unit 315 of the balance condition.

30       A system and security management unit 316 serves to entirely maintain and manage the bank server system 300, to protect the bank server system 300 from being invaded by hackers, and to find out the invasions of the hackers. Further, the system and security management unit 316 serves to prevent the data

conversion, which may occur at the time of transmitting and receiving the data via the network, and to authenticate the members.

5 The cable and wireless Internet connection unit 317 performs an Internet protocol function necessary upon the member registration/log-on and the Internet banking, and serves to transmit various messages for wireless banking services as well as the aforementioned barcode.

10 Fig. 4 is a schematic view of the shop client system 400 in accordance with the present invention. With reference to Fig. 4, the shop client system 400 is arranged at individual shops. The shop client system 400 performs various procedures and functions for the electronic settlement by the member. A barcode scanner for scanning the LCD barcode displayed on the member's mobile terminal is installed on the shop client system 400. The shop client system 400 comprises a shop controller 410, a monitor 420, and a keyboard 430.

15 The shop controller 410 comprises a settlement processing unit 411, a sales slip output unit 412, a user identification processing unit 413, and a network connection unit 414. The settlement processing unit 411 performs the settlement transaction according to the notification of the user identification. The sales slip output unit 412 outputs a sales slip. The user identification processing unit 413 identifies the user. The network connection unit 414 serves to be connected to  
20 Internet.

The user identification processing unit 413 outputs a message saying, "Input a password" on the monitor 420. Then, the member inputs his/her password via the keyboard 430. The user identification processing unit 413 transmits the password inputted by the member to the bank server system 300 via  
25 the network connection unit 414 and requests the bank server system 300 to identify the user. Based on the user identification result transmitted from the bank server system 300, the user identification processing unit 413 outputs a message saying "Input again a password" or "Settlement impossible". When the user is identified as the member, the user identification processing unit 413 notifies  
30 the settlement processing unit 411 of this fact.

The settlement processing unit 411 finds out a relevant bank, which issues the member's settlement account, using the first two spaces of the barcode data read by the barcode scanner 600, and then determines a member code including

sixteen spaces using the front two spaces and the middle fourteen spaces representing the member's number of the barcodes. Then, the settlement processing unit 411 outputs a message saying "Input a total amount to be settled using a keyboard". When a shop clerk inputs the total amount to be settled via the keyboard 430, the settlement processing unit 411 is connected to the relevant bank server system 300 using the member code via the network connection unit 414 and requests the bank server system 300 to check the balance on the member's account. When the bank server system 300 notifies the settlement processing unit 411 of the settlement possibility via the network connection unit 414, the settlement processing unit 411 notifies the user identification processing unit 413 that the user is actually an owner of the barcode. Then, when the user identification processing unit 413 notifies the settlement processing unit 411 of the user identification, the settlement processing unit 411 transmits the member number and the settlement amount to the sales slip output unit 412.

The sales slip output unit 412 serves to output the sales slip for signature by the member through a printer. After the member signs his/her name on the outputted sale slip, one sheet of the signed slips is given to the member and the remaining two sheets are stored by the shop.

Fig. 5 is a schematic view of the cash payment client system 500 in accordance with the present invention. With reference to Fig. 5, the cash payment client system 500 comprises a controller 510, a monitor 520, a keyboard 530, and a cash dispenser 540 for providing the corresponding amount of cash to the member according to the notification of cash payment possibility. The controller 510 comprises a cash payment processing unit 511 for processing the cash payment, a statement output unit 512 for outputting a detailed statement for payment, a user identification processing unit 513, and a network connection unit 514. The user identification processing unit 513 requests the bank server system 300 to identify the user, thereby performing the identification of the user. The network connection unit 514 connects the user identification processing unit 513 to Internet.

The cash payment processing unit 511 requests via the monitor 520 the member to input his/her password, and then transmits the inputted password by the keyboard 530 to the user identification processing unit 513. Further, the cash

payment processing unit 511 receives the payment amount data inputted by the keyboard 530 and requests the corresponding bank server system 300 to check the member's account and the balance of the account via the network connection unit 514. Then, in case the cash payment is possible, the cash payment processing unit 511 notifies the cash dispenser 540 of the cash payment possibility.

The user identification processing unit 513 requests the bank server system 300 to verify whether the member number of the LCD barcode and the password are identical with the stored data of the bank server system 300 via the radio Internetwork by the network connection unit 514. In case the member number of the LCD barcode and the password are not identical with the stored data of the bank server system 300, the user identification processing unit 513 requests the user to input again his/her password or outputs a message saying "Unusable" on the monitor 520. On the other hand, in case the member number of the LCD barcode and the password are identical with the stored data of the bank server system 300, the user identification processing unit 513 notifies the cash payment processing unit 511 of this fact.

The barcode scanner 600 scans the LCD barcode including eighteen spaces displayed on the LCD window of the mobile terminal 100 and decodes the sixteen spaces corresponding to the member number using the last two spaces corresponding to the check code. The barcode scanner 600 transmits the decoded barcode data to the shop client system 400 or the cash payment client system 500.

Fig. 6 is a schematic view showing an example of the barcode applied in the present invention. With reference to Fig. 6, even though the present invention uses a first dimensional barcode, the barcode is not limited to its code type. As shown in Fig. 6, the barcode of the present invention consists of eighteen bars defining individual decimal numbers. The first two bars serve to represent the bank code of the corresponding bank. Since one member usually possesses a plurality of bank cards, two bars are provided to recognize department cards and various services using barcodes as well as various bank cards. The middle fourteen bars represent the member number and serves to recognize the user as the member of each bank. The last two bars represent the check code for checking whether the barcode data is correct or not. Since except for the check code, total sixteen bars correspond to sixteen single numbers of a conventional credit card, the

conventional bank card number may be directly changed to the barcode of the present invention.

Fig. 7 is a flow chart of an electronic settlement method using the LCD barcode displayed on the mobile terminal in accordance with the present invention, and Fig. 8 is a flow chart of a cash payment method using the LCD barcode displayed on the mobile terminal in accordance with the present invention.

Hereinafter, the operation of the present invention will be described in detail with reference to the accompanying drawings.

With reference to Figs. 1 to 7, the electronic settlement method and the cash payment method using the LCD barcode displayed on the mobile terminal of the present invention are described. In the step (a), a user is connected to the bank server system 300 via the computer 200 or the mobile terminal 100 and registers for the system 300 to become a member. Then, the bank server system 300 provides a specific barcode to the registered member. That is, in order to receive the electronic settlement service of the present invention, the user must register for the system as the member on-line or off-line. Herein, the on-line registration methods are divided into two types. One method uses the computer 200 and the other method uses the mobile terminal 100. When the user is registered as the member using the aforementioned methods, the bank server system 300 stores a member's information including a name, a resident registration number, a mobile terminal number, a telephone number, an address, gender, occupation, etc., in its internal database. Further, the bank server system 300 creates barcodes according to the members or the accounts, and transmits the created barcodes to the mobile terminals 100 of the corresponding members via wireless Internet, thereby displaying the barcodes on the LCD window of the mobile terminals 100 of the members.

More particularly, in order to register for the system to become a member, the user is connected to the bank server system 300 via the personal computer 200. Then, the member management unit 311 of the bank server system 300 informs the users of the contract, the service introduction, the member registration procedure, etc., and stores the names, the resident registration numbers, the mobile terminal numbers, the telephone numbers, the addresses, the genders, the occupations, etc., inputted by the members, in the database 314. Upon the member cancellation,

the member management unit 311 clears the database 314, including the above data of the member. Further, the member management unit 311 stores a history showing all services provided from the bank server system 300 to the member, and creates a congratulatory message and then transmits it to the cable and wireless  
5 Internet connection unit 317 on a member's special occasion such as a birthday or a wedding anniversary, thereby more organically and systematically performing the member management.

When the registration of the member is completed, the member management unit 311 requests the barcode creation unit 312 to create the member's specific  
10 barcode. Herein, the barcode creation unit 312 receives the request for the member's specific barcode from the member management unit 311 and selects a member number consisting of sixteen single numbers. Whether the member number is already used by the existing member is checked. For example, since the first two bars represent the bank code, each bank may substantially set a  
15 member number including fourteen bars. After the last two bars are created as the check code, the barcode data consisting of eighteen bars as shown in Fig. 6 are created. (S71)

Next, in the step (b), the barcode conferred on each member is transmitted to the mobile terminal 100 of the corresponding member. That is, the created  
20 barcode is transmitted to the cable and wireless Internet connection unit 317 of the bank server system 300, and then the cable and wireless Internet connection unit 317 outputs the transmitted barcode to the mobile terminal 100 of the corresponding member via mobile communication network. Thereby, the registered member can use the barcode displayed on the LCD window of his/her  
25 mobile terminal 100.

After the member registration is completed, the account management is performed. Herein, the account management unit 313 of the bank server system 300 manages the transaction history of the account of the member, and all the changes of the account data are stored in the database 314. Via the above account  
30 management, the account management unit 313 performs the account check function, upon receiving a request for the account checking from the shop client system 400 or the cash payment client system 500. The account management is processed at any time. After the member registration and the account checking

are completed, the barcode transmission is performed. Herein, the member management unit 311 of the bank server system 300 transmits the created barcode to the mobile terminal 100 of the newly registered member by the cable and wireless Internet connection unit 317.

5           Herein, the mobile terminal 100 of the member receives and stores the LCD barcode data of the member from the bank server system 300 via wireless Internet, and then, if necessary, exhibits the stored barcode on its LCD window. The mobile terminal 100 in connection with the bank server system 300 performs functions of transmitting and receiving various messages for wireless banking  
10           services. Particularly, since the front part the LCD barcode data represents the bank code, a plurality of the barcodes representing different banks may be stored by the mobile terminal 100 and then the user may select one from these barcodes according to desired banks.

          As described above, the barcode transmitted from the bank server system  
15           300 is received by the mobile terminal 100 of the member via wireless network, thereby performing the barcode transmission. The received barcode is stored by the mobile terminal 100 and then is exhibited for use at the shop or the cash dispenser. Since each bank has an identical barcode system, the member may store a plurality of the barcodes representing different banks in his/her mobile  
20           terminal 100 as many as his/her accounts. (S72)

          Hereinafter, the electronic settlement method using the LCD barcode displayed on the mobile terminal in accordance with the present invention is described in detail.

          In the step (c), the barcode stored by the mobile terminal 100 of the member,  
25           the password of the member, and the amount to be settled are inputted. That is, when the member wants to perform the electronic settlement, the member first selects a desired bank and exhibits the corresponding barcode on the LCD window his/her mobile terminal 100. The exhibited barcode is scanned by the barcode scanner 600 installed on a counter of the shop or a cash dispenser. That is, when  
30           the member exhibits the LCD barcode in order to receive the credit card service or the cash payment service, the LCD barcode is scanned by the barcode scanner 600 and then transmitted to the shop client system 400. Then, a member's password is inputted to the shop client system 400 by the keyboard 430. As described



above, when the member wants to perform the electronic settlement, the scanned barcode data by the scanner 600 is transmitted to the settlement processing unit 411 of the shop client system 400 (S73).

5       Next, in the step (d), the shop client system 400 transmits barcode data, the member's password, and the total amount to be settled, inputted via Internet, to the bank server system 300 and requests the bank server system 300 to settle the total amount. That is, the settlement processing unit 411 find outs a corresponding bank using the first two numbers of the barcode data, i.e., the bank code, and then determines a member code including total sixteen numbers, using  
10       the first two numbers representing the bank code and the middle fourteen numbers representing the member's number of the barcodes. Then, the settlement processing unit 411 outputs a message saying "Input a total amount to be settled by a keyboard" on the monitor 420. Next, the settlement processing unit 411 of the shop client system 400 is connected to the corresponding bank server system 300  
15       via the network connection unit 414 and requests the corresponding bank server system 300 to check the member's account and the balance on the member's account. (S74)

20       In the step (e), upon receiving the request for the electronic settlement from the shop client system, the bank server system 300 verifies the member's settlement possibility. In case the settlement is possible, the bank server system 300 performs the settlement and transmits settlement completion data to the requested shop client system 400. On the other hand, in case the settlement is impossible, the bank server system 300 transmits settlement impossibility data to the requested shop client system 400.

25       More specifically, the bank server system 300 performs several functions, such as an account management function for credit card service, an account balance check function for small amount settlement service allowing the electronic settlement of traffic expenses and the use of the vending machine without coins, a deposit managing and balance check function for advance payment card service  
30       allowing the user to use an advance payment card charged with a designated amount of money. Further, the bank server system 300 performs a cable and wireless banking service function for providing to the members services such as account checking and money transfer from an account to another account and

introducing to the members various new products of the bank via radio or wireless network.

Upon receiving the request for the electronic settlement service from the shop client system 400, the account management unit 313 of the bank server system 300 performs the function of verifying the member's settlement possibility. When the settlement is possible, in case of the advance payment service, the account management unit 313 verifies whether the payment amount of the member is more than a limit, i.e., a predetermined limit of his/her advance payment card. In case the payment amount is not more than the limit, the account management unit 313 performs the settlement and notifies the requested shop client system 400 of a settlement result. On the other hand, in case the payment amount is more than the limit, the account management unit 313 notifies the shop client system 400 of a settlement impossible message via the network. Further, upon receiving the request for the balance check, the account management unit 313 checks the database regarding to the account of the corresponding member and then transmits the checked balance condition. (S75~S77).

Finally, in the step (f), in case the settlement completion data are transmitted to the requested shop client system 400, the shop client system 400 processes the settlement transaction. On the other hand, in case the settlement impossibility data are transmitted to the requested shop client system 400, the shop client system 400 displays the reason of the settlement impossibility via a screen.

When the shop client system 400 receives the settlement possibility message from the bank server system 300, the user identification processing unit 413 of the shop client system 400 verifies whether the user is an actual owner of the barcode. After the electronic settlement is completed via the user identification, the sales slip output unit 412 of the shop client system 400 outputs a sales slip for signature by the member through a printer.

In case the settlement is impossible due to bad credit or balance deficiency, the user identification processing unit 413 outputs a message saying "Input again a password" or "Settlement impossible" via the monitor based on the user identification result transmitted from the bank server system 300. (S78 and S79)

As described above, the sales slip output unit 412 serves to output the sales slip for signature by the member through the printer. After the member signs

his/her name on the outputted sale slip, one sheet of the signed slips is given to the member and the remaining two sheets are stored by the shop.

Hereinafter, the cash payment method using the LCD barcode displayed on the mobile terminal in accordance with the present invention is described in detail.

With reference to Figs. 1 to 8, the cash payment system of the present invention comprises the same steps (a) to (c) as the aforementioned electronic settlement method of the present invention. Therefore, the steps (a) to (c) of the cash payment system are omitted, and subsequent steps of the cash payment system are described below.

In the step (d), the cash payment client system 500 transmits the inputted barcode data, member's password, and total amount to be paid, to the bank server system 300 and requests the bank server system 300 to pay this amount. (S81 and S82)

The cash payment client system 500 performs various procedures and functions for providing the cash payment service. Similarly to the aforementioned shop client system 400, when a member wants to perform the cash payment, the member exhibit his/her LCD barcode on the LCD window his/her mobile terminal 100. The exhibited barcode is scanned by the barcode scanner 600. The barcode scanner 600 transmits the scanned LCD barcode to the cash payment processing unit 511 of the cash payment client system 500.

Herein, the cash payment processing unit 511 requests via the monitor 510 the member to input his/her password, and then transmits the inputted password by the keyboard 530 to the user identification processing unit 513. The user identification processing unit 513 of the cash payment client system 500 is connected to the corresponding bank server system 300 via radio Internetwork by the network connection unit 514 and requests the corresponding bank server system 300 to verify whether the member number of the LCD barcode and the password are identical with the stored data of the bank server system 300.

Next, the cash payment processing unit 511 receives the amount to be paid, inputted by the keyboard, and requests the bank server system 300 to check the member's account and the balance on the member's account via the network connection unit 514.

In the step (e), upon receiving the request for the cash payment from a cash payment client system 500, the bank server system 300 verifies the member's cash payment possibility. In case the cash payment is possible, the bank server system 300 transmits cash payment possibility data to the requested cash payment client system 500. On the other hand, in case the cash payment is impossible, the bank server system 300 transmits cash payment impossibility data to the requested cash payment client system 500. (S84 and S85)

Finally, in the step (f), in case the cash payment possibility data are transmitted to the requested cash payment client system 500, the cash payment client system 500 processes the cash payment and outputs a detailed statement for payment. On the other hand, in case the cash payment impossibility data are transferred to the requested cash payment client system 500, the cash payment client system 500 displays the reason of the settlement impossibility via a screen. More specifically, in case the member number of the LCD barcode and the password are not identical with the stored data of the bank server system 300, the user identification processing unit 513 of the cash payment client system 500 requests the member to input again his/her password or outputs a message saying "Unusable" on the monitor 520. On the other hand, in case the member number of the LCD barcode and the password are identical with the stored data of the bank server system 300, the user identification processing unit 513 notifies the cash payment processing unit 511 of this fact. Then, the cash payment processing unit 511 requests the member to input the amount of cash to be paid, and in case the cash payment is possible, gives the member cash of the inputted amount via the cash dispenser 540. (S86 and S87)

Herein, the statement output unit 512 outputs the detailed statement for payment. After the electronic settlement is completed via the user identification, the cash payment processing unit 511 gives the member the corresponding cash via the cash dispenser 540 and outputs the detailed statement including payment data via statement output unit 512, thereby providing the cash payment service.

In accordance with the above-described present invention, the members perform the settlement transaction at shops or the cash payment using the mobile terminal.

As described above, the present invention provides an electronic

settlement system, an electronic settlement method, and a cash payment method using a LCD barcode displayed on a mobile terminal, thereby providing electronic settlement services to the members at shops by transmitting a member's specific barcode from a bank to a member's mobile terminal via wireless network and using the barcode, small amount settlement services for settling traffic expenses and for use of a vending machine without coins, advance payment card services by depositing a designated amount of money at a database of the bank and allowing the user to systematically use the advance card within the deposited money, and wireless banking services for transmitting and receiving various banking related data via wireless network between the bank and the members. Therefore, the electronic settlement system of the present invention safely and synthetically performs various credit card services and banking services only with the mobile terminal.

#### Industrial Applicability

As apparent from the above description, the present invention provides an electronic settlement system, an electronic settlement method, and a cash payment method using a LCD barcode displayed on a mobile terminal. The present invention has many advantages as follows.

1. The electronic settlement system of the present invention uses a portable mobile terminal, thereby removing the conventional inconvenience in possession of numerous credit cards.

2. Barcode data transmitted from individual banks are stored by the mobile terminal, thereby simplifying the management compared to the conventional system with a plurality of cards.

3. The electronic settlement system of the present invention uses LCD barcodes instead of the conventional magnetic cards, thereby reducing the cost in producing the cards.

4. The conventional magnetic credit card for credit card service was easily lost by carelessness of a user, and a long time is required to reissue a new credit card. The electronic settlement system of the present invention eliminates the possibility of loss and provides a swift service.

5. The conventional IC card for smart card service with an electronic currency function must be recharged after completely spending the stored money. The electronic settlement system of the present invention eliminates this requirement and provides a convenience.

5        6. The conventional magnetic credit card cannot be connected via network. On the other hand, since the mobile terminal employed by the electronic settlement system of the present invention transmits and receives various messages, the present invention performs various banking services.

10       7. The small amount settlement service of the smart card service and the credit card service can be integrated as the electronic settlement system of the present invention.

8. The electronic settlement system of the present invention performs additional services relevant to customer management as well as settlement services in department stores.

15       9. The electronic settlement system of the present invention is connected to a customer management system for providing tickets, coupons, and other customer card services using LCD barcodes of the mobile terminal, thereby allowing the users to simply and conveniently use the system.

20       Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

## Claims:

1. An electronic settlement system using a LCD barcode displayed on a mobile terminal via Internet 50, said electronic settlement system comprising:

5 a mobile terminal 100 for performing member registration via wireless Internet and LCD barcode receiving and storing functions and displaying the LCD barcode;

a computer 200 for performing the member registration via Internet;

10 a bank server system 300 for creating individual barcodes for each member, transmitting the created barcode to the corresponding mobile terminal 100 upon member registration, responding to each request, and transmitting a result of the user's identification and a settlement authentication upon requests for user's identification and settlement;

a barcode scanner 600 for reading the LCD barcode of the mobile terminal 100;

15 a shop client system 400 for receiving inputted data including a total amount to be settled and a member's password as well as the LCD barcode read by the scanner 600, requesting the bank server system 300 to identify the user and to settle the amount, being notified of the result of the user's identification and the settlement authentication by the bank server system 300, performing the settlement transaction, and outputting a settlement slip; and

20 a cash payment client system 500 for receiving inputted data including a total amount to be paid and a member's password as well as the LCD barcode read by the scanner 600, requesting the bank server system 300 to identify the user and to verify the possibility of cash payment, being notified of the result of the user's identification and the result of the verification of the cash payment possibility by the bank server system 300, performing the cash payment transaction, and outputting a detailed statement for payment.

25 2. The electronic settlement system using the LCD barcode displayed on the mobile terminal as set forth in claim 1, wherein the bank server system 300 comprises:

30 a controller 310 for controlling member management, barcode creation,

account management, database, and security management functions, said controller 310 including:

- a member management unit 311 for managing registration and cancellation of members;
- 5 a barcode creation unit 312 for creating a member's specific barcode;
- an account management unit 313 for managing the whole transaction history of a member's account;
- 10 a database 314 for storing and managing various data including member's information data, barcode data, account data, maintenance and management data relating to the system operation, and data for Internet banking services;
- a wireless banking service unit 315 for performing wireless banking services; and
- 15 a cable and wireless Internet connection unit 317 for performing cable and wireless Internet connection functions;
- a monitor 320 for outputting a screen by the control of the controller 310;
- and
- a keyboard 330 for key-inputting data.

20 3. The electronic settlement system using the LCD barcode displayed on the mobile terminal as set forth in claim 2, wherein the barcode creation unit 312 of the bank server system 300 creates a plurality of different barcodes as many as the accounts of the member.

25 4. The electronic settlement system using the LCD barcode displayed on the mobile terminal as set forth in claim 1, wherein the shop client system 400 comprises:

- a shop controller 410 including:
  - a settlement processing unit 411 for performing the settlement transaction according to the notification of the user identification;
  - 30 a sales slip output unit 412 for outputting a sales slip;
  - an user identification processing unit 413 for identifying a user;



and

a network connection unit 414 for performing an Internet connection function;

a monitor 420 for outputting processing conditions and results; and

5 a keyboard 430 for key-inputting data including the password.

5. The electronic settlement system using the LCD barcode displayed on the mobile terminal as set forth in claim 1, wherein the cash payment client system 500 comprises:

a controller 510 including:

10 a cash payment processing unit 511 for processing the cash payment according to the notification of the user identification;

a statement output unit 512 for outputting the detailed statement for payment;

15 a user identification processing unit 513 for requesting the user identification and verifying the user identification; and

a network connection unit 514 for connecting the user identification processing unit 513 to Internet;

a monitor 520 for outputting processing conditions and results;

20 a keyboard 530 for key-inputting the password and the amount to be paid;

and

a cash dispenser 540 for dispensing the corresponding amount to the member according to the notification of cash payment possibility.

25 6. An electronic settlement method using a LCD barcode displayed on a mobile terminal via Internet, said electronic settlement method comprising the steps of:

(a) allowing a user to be connected to a bank server system using a computer or a mobile terminal and to register for the system to become a member, and conferring a specific barcode on the registered member;

30 (b) transmitting the conferred barcode to the mobile terminal of the corresponding member;

(c) inputting the barcode stored by the member's mobile terminal, a

member's password, and total amount to be settled;

(d) transmitting the inputted barcode data, the member's password, and the total amount to be settled to the bank server system, and requesting the bank server system to settle the total amount;

5 (e) verifying the member's settlement possibility upon receiving a request for the electronic settlement from a shop client system, and then in case the settlement is possible, performing the settlement and transmitting settlement completion data to the requested shop client system or in case the settlement is impossible, transmitting settlement impossibility data to the requested shop client system; and

10 (f) processing the settlement transaction in case the settlement completion data are transmitted to the requested shop client system, or displaying the reason of the settlement impossibility via a screen in case the settlement impossibility data are transmitted to the requested shop client system.

15 7. The electronic settlement method using the LCD barcode displayed on the mobile terminal as set forth in claim 6, wherein during the step (a), upon a request for member registration, a user is registered as a member and member information including a name, a resident registration number, a mobile terminal number, a telephone number, an address, a gender, and an occupation are inputted

20 by the member and stored in a database.

8. The electronic settlement method using the LCD barcode displayed on the mobile terminal as set forth in claim 7, wherein during the step (a), different barcodes are conferred according to member's accounts.

25 9. The electronic settlement method using the LCD barcode displayed on the mobile terminal as set forth in claim 8, wherein each barcode of the step (a) includes a bank identification number, a member identification number, and check code data.

10. The electronic settlement method using the LCD barcode displayed on the mobile terminal as set forth in claim 9, wherein during the step (e), the

settlement is differently performed according to settlement methods such as credit card settlement, small amount settlement, and advance payment card settlement.

11. A cash payment method using a LCD barcode displayed on a mobile terminal via Internet, said cash payment method comprising the steps of:

5 (a) allowing a user to be connected to a bank server system using a computer or a mobile terminal and to register for the system to become a member, and conferring a specific barcode on the registered member;

(b) transmitting the conferred barcode to the mobile terminal of the corresponding member;

10 (c) inputting the barcode stored by the member's mobile terminal, a member's password, and total amount to be paid;

(d) transmitting the inputted barcode data, the member's password, and the total amount to be paid to the bank server system, and requesting the bank server system to pay the total amount of cash;

15 (e) verifying the member's cash payment possibility upon receiving a request for the cash payment from a cash payment client system, and then in case the cash payment is possible, transmitting cash payment possibility data to the requested cash payment client system or in case the cash payment is impossible, transmitting cash payment impossibility data to the requested cash payment client system; and

20 (f) processing the cash payment in case the cash payment possibility data are transmitted to the requested cash payment client system, or displaying the reason of the settlement impossibility via a screen in case the settlement impossibility data are transmitted to the requested cash payment client system.

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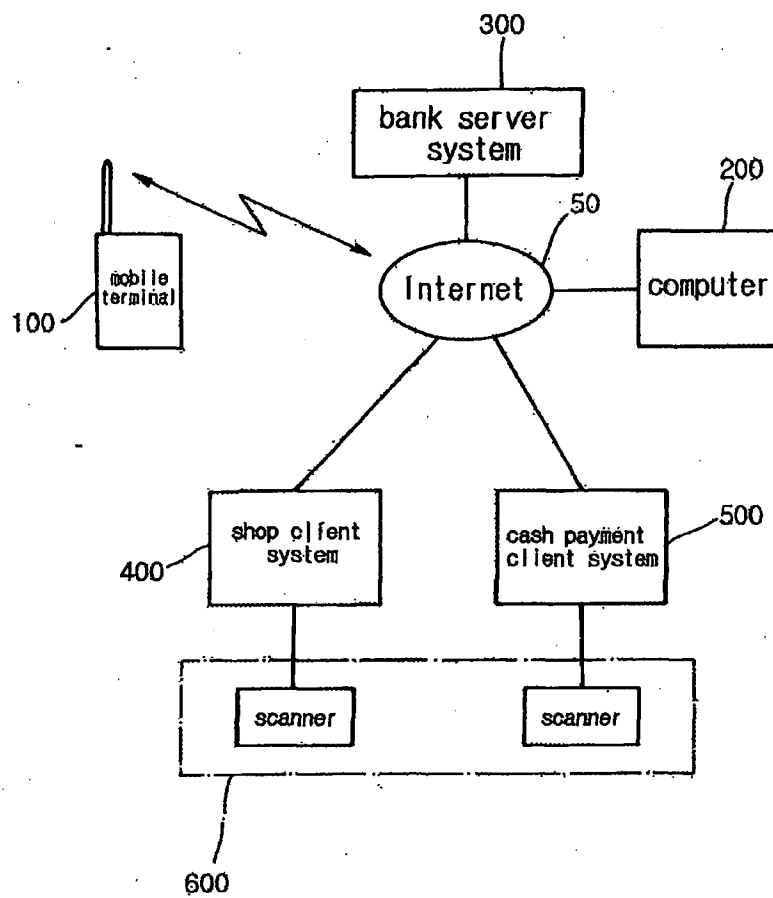


FIG. 1

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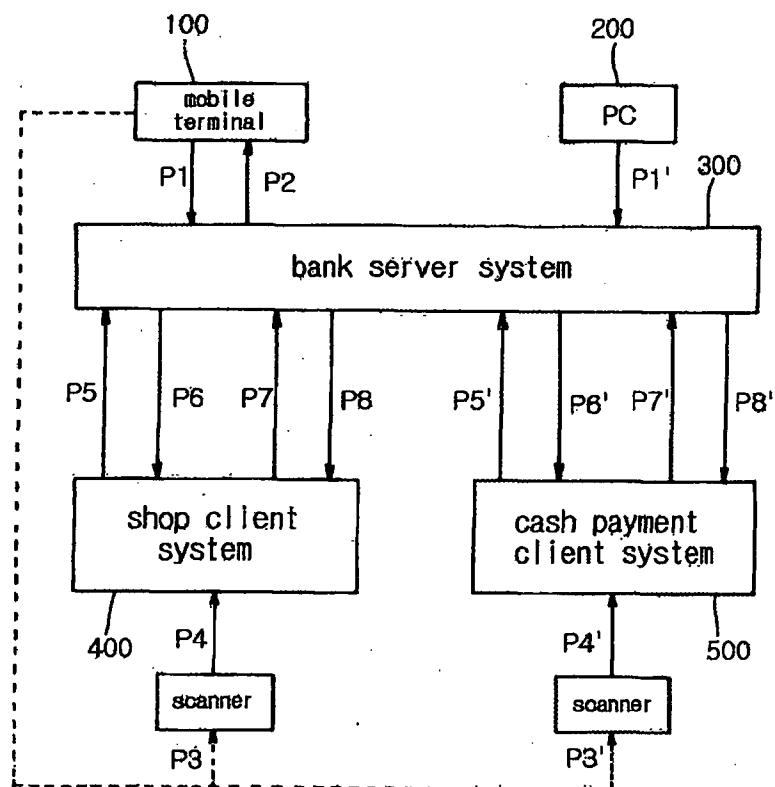


FIG. 2

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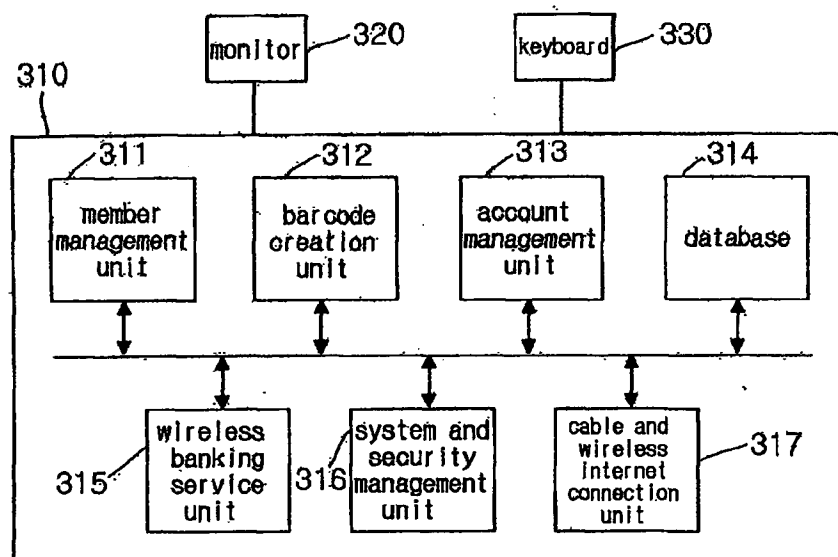


FIG. 3

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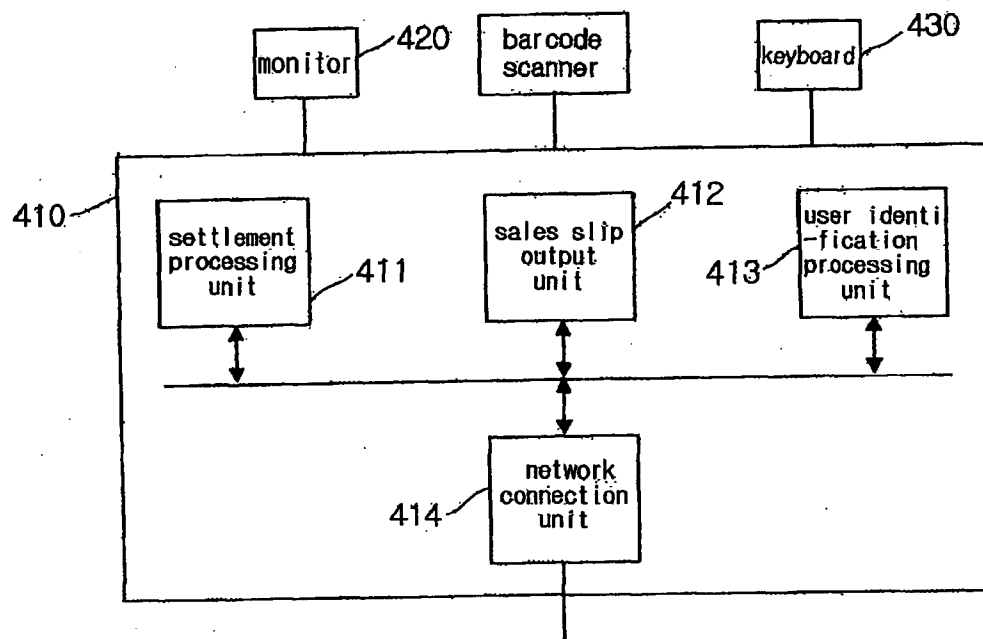


FIG. 4

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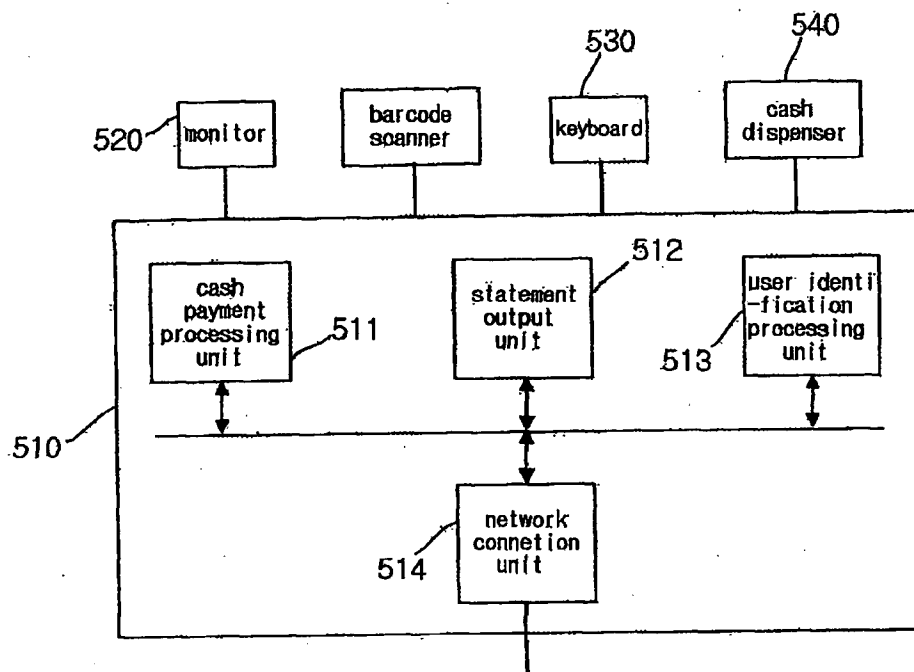


FIG. 5

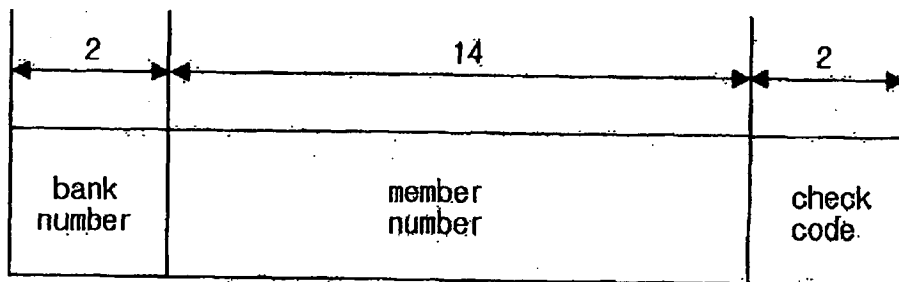


FIG. 6



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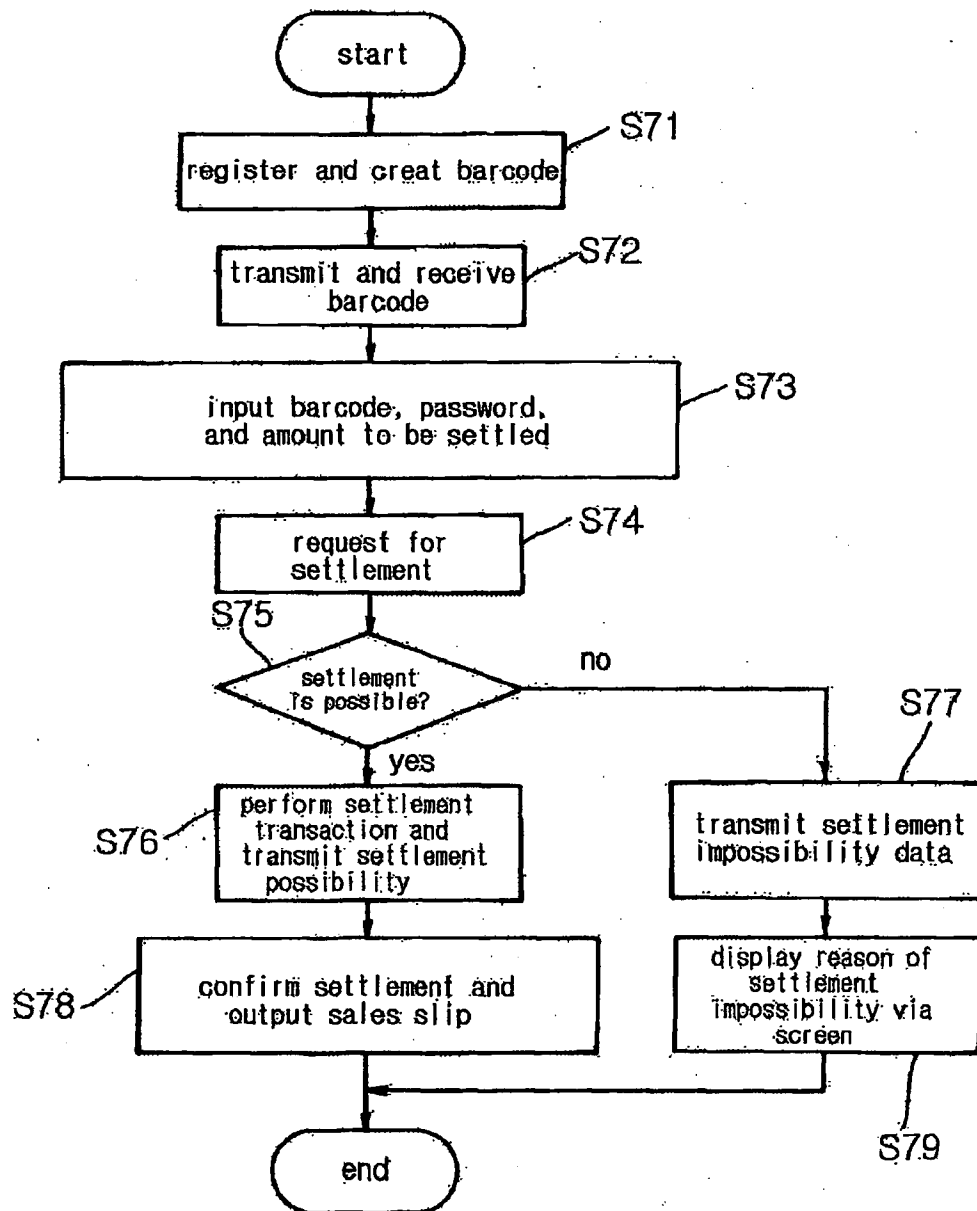


FIG. 7

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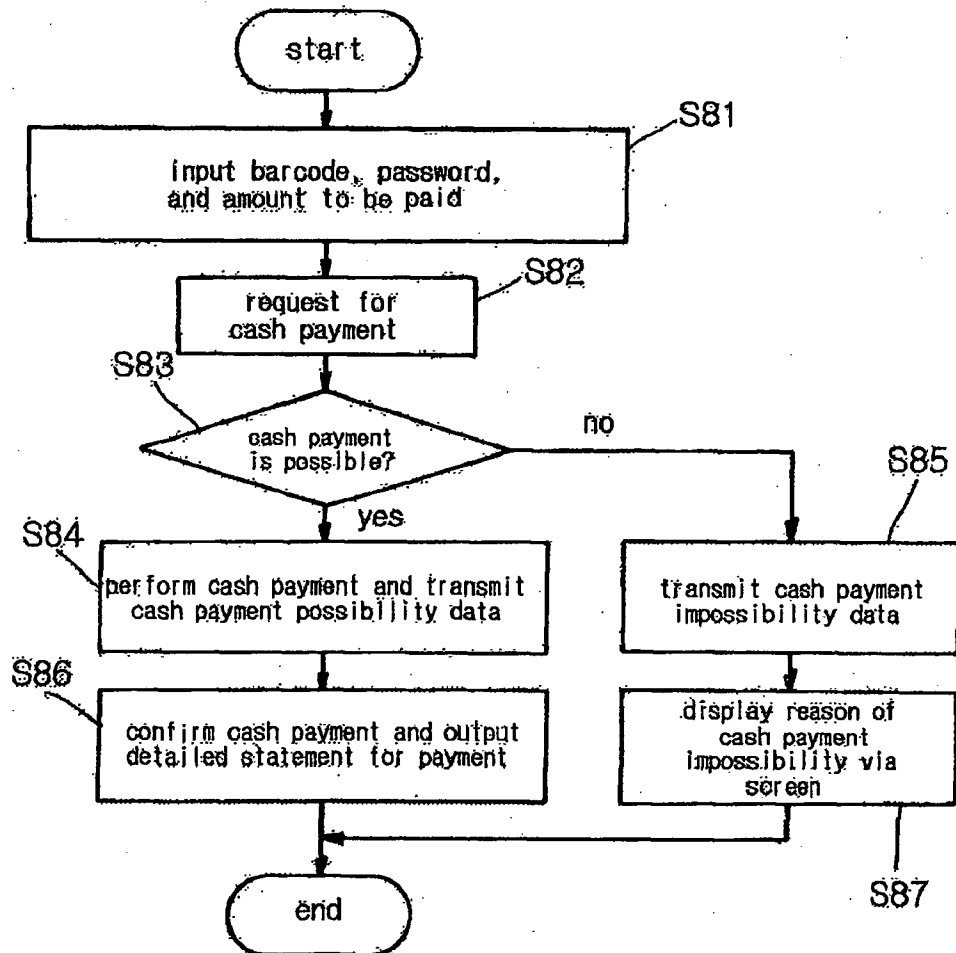


FIG. 8

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR02/00745

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC7 G06F 17/60

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC7 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

KR : IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 00-37046(Ique telecom Co., LTD.) 05 Jul 2000	1-11
A	KR 01-8131(Park jungil) 05 Feb 2001	1-11
A	KR 02-4103(Igen mobile Co., LTD.) 16 Jan 2002	1-11

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

\* Special categories of cited documents:

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"&amp;" document member of the same patent family

Date of the actual completion of the international search

05 AUGUST 2002 (05.08.2002)

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